

## Supporting file

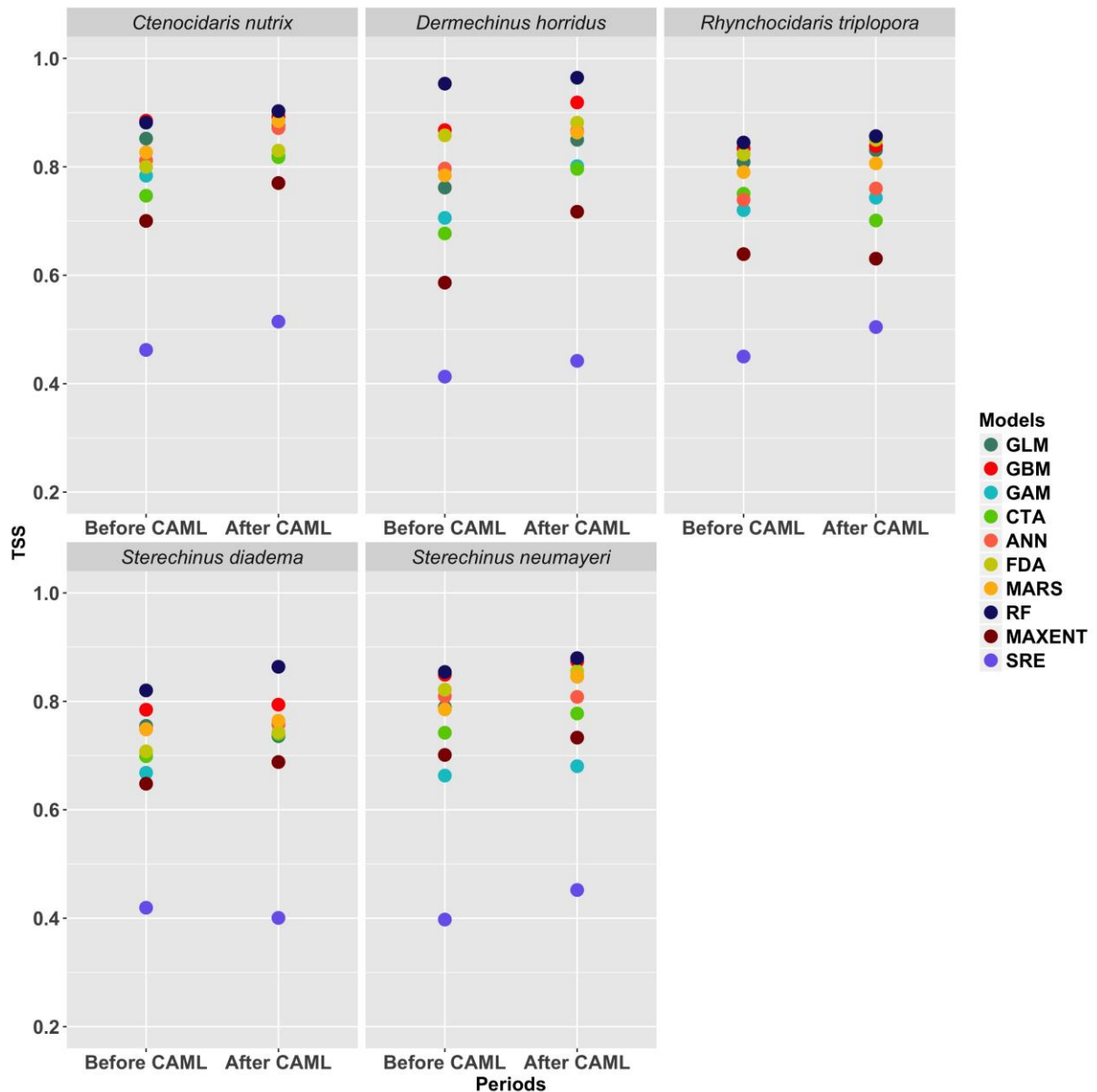


Figure S1.1. Predictive performance of models performed for each species with and without CAML data and for ten different modelling methods. Generalized Linear Models (GLM), Generalized Boosted Models (GBM), Generalized Additive Models (GAM), Classification Tree Analysis (CTA), Artificial Neural Networks (ANN), Flexible Discriminant Analysis (FDA), Multivariate Adaptive Regression Spines (MARS), Random Forests (RF) Maximum Entropy modelling (Maxent) and Surface Response Envelop (SRE). All models were run using default settings (given by the R command: `biomod2 ::Print_Default_ModelingOptions()`).

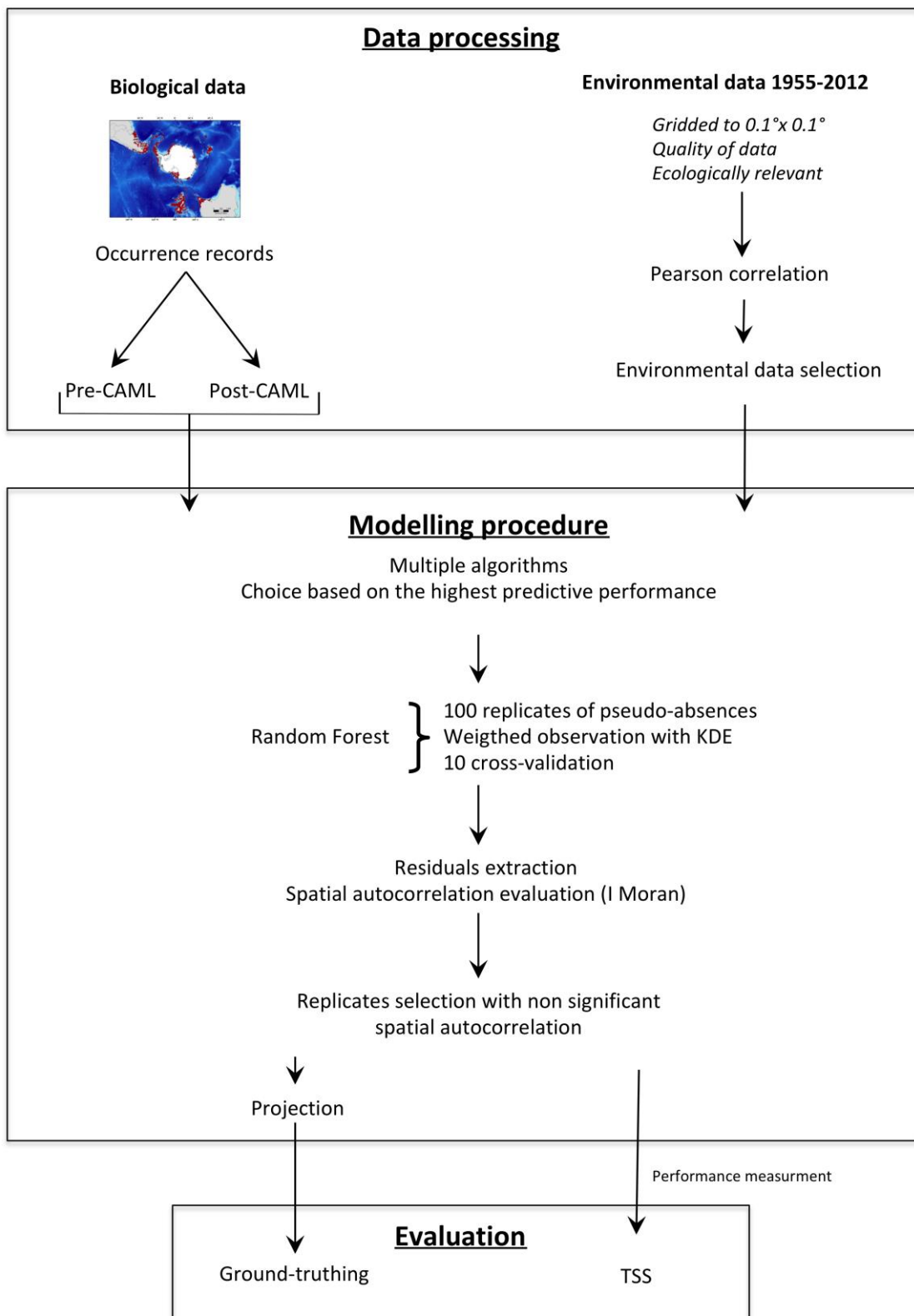


Figure S1.2: Workflow diagram used to assess the effect of sampling effort on SDM performance

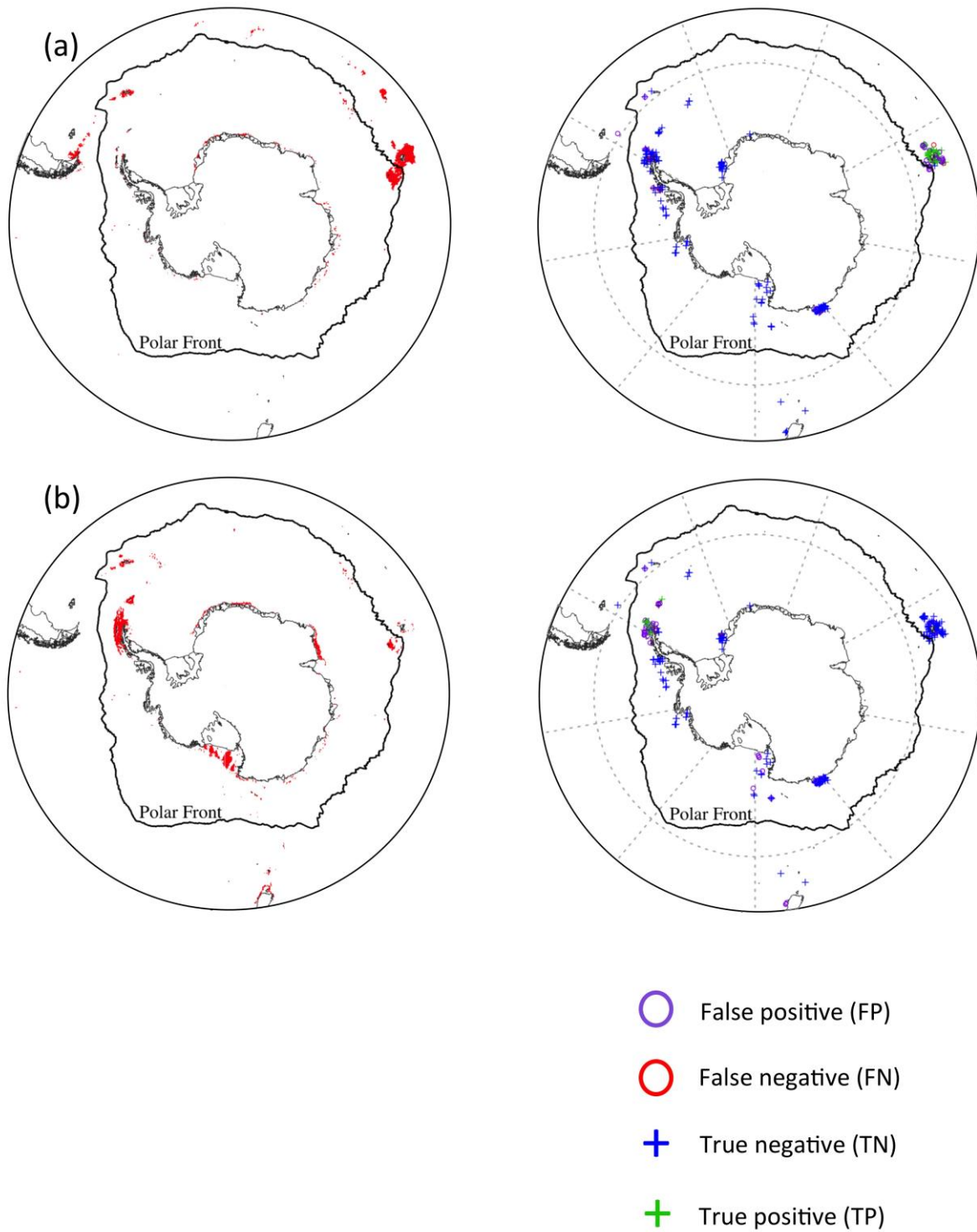


Figure S1.3. Left: SDM projections carried out without data collected during the CAML period. Species suitable areas in red. Right: position of new records obtained during the CAML period; purple and red circles for false positives (FP) and false negatives (FN) respectively; blue and green crosses for true negatives (TN) and true positives (TP) respectively. Distribution maps for: a) *Ctenocidaris nutrix*, b) *Rhynchocidaris triplopora*, c) *Dermechinus horridus*, d) *Sterechinus diadema*, e) *Sterechinus neumayeri*

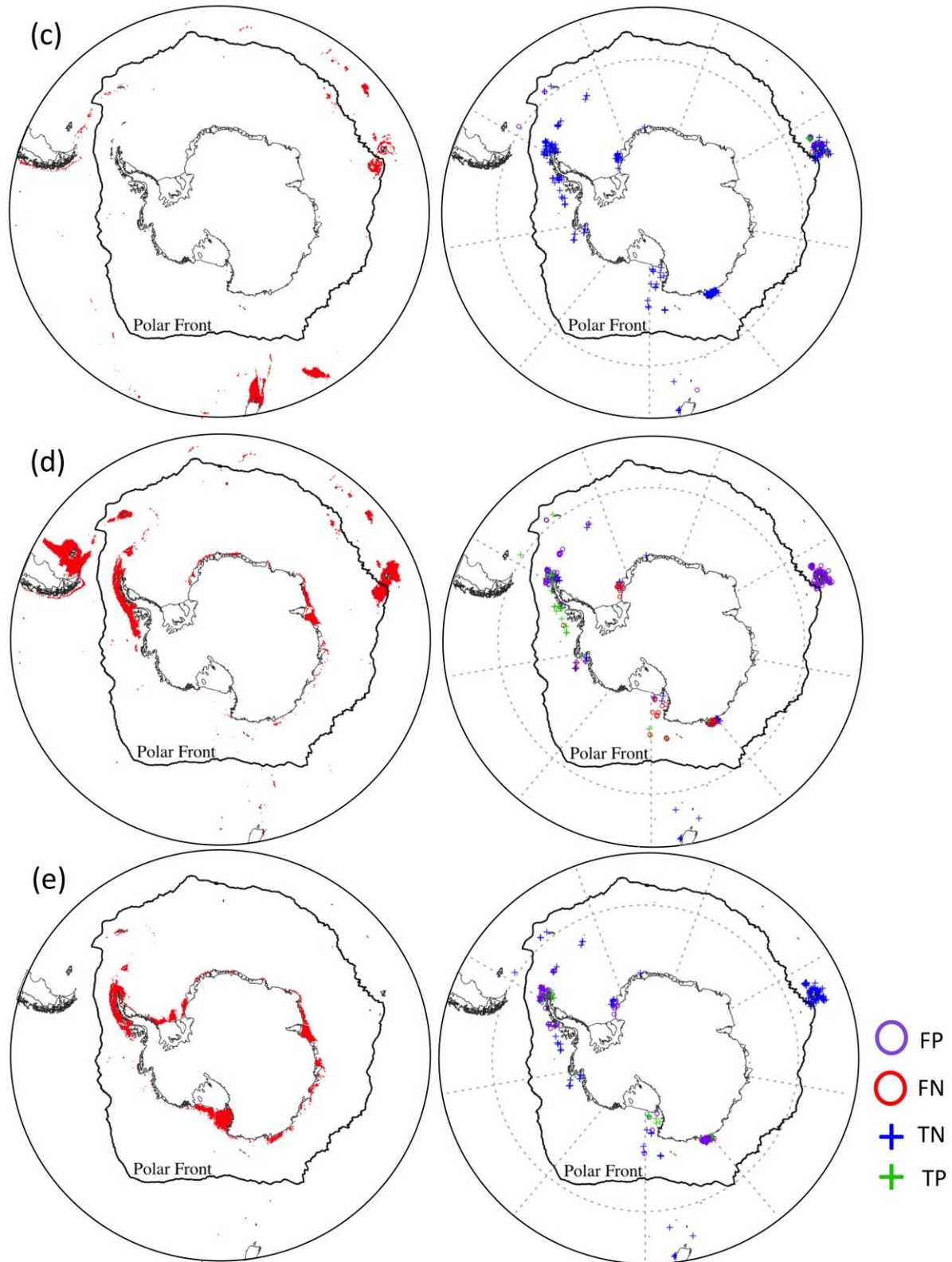


Figure S1.3. (following) Left: SDM projections carried out without data collected during the CAML period. Species suitable areas in red. Right: position of new records obtained during the CAML period; purple and red circles for false positives (FP) and false negatives (FN) respectively; blue and green crosses for true negatives (TN) and true positives (TP) respectively. Distribution maps for: a) *Ctenocidaris nutrix*, b) *Rhynchocidaris triplopora*, c) *Dermechinus horridus*, d) *Sterechinus diadema*, e) *Sterechinus neumayeri*

				<i>R. triplopora</i>			
				FP		FN	
				Mission	Proportion	Mission	Proportion
				Antarktis XXIII	13.64	Antarktis XXIII	33.33
				ANT-XXIX-3	27.27	JR 144 BIOPEARL I	33.33
				CEAMARC V3	9.09	Nodata	33.33
				JR 144	15.91		
				BIOPEARL I			
				NIWA Database	22.73		
				BENTART 06	2.27		
				POKER II	9.09		
				<i>S. diadema</i>			
				FP		FN	
				Mission	Proportion	Mission	Proportion
				Antarktis XXIII	10.34	BENTART 06	1.69
				ANT-XXIX-3	9.48	ChEsSo	1.69
				CEAMARC V3	1.72	CEAMARC	49.15
				JR 144 BIOPEARL I	9.48	JR 179 BIOPEARL II	5.08
				PROTEKER	0.86	NIWA Database	23.73
				JR 230	2.59	Nodata	18.64
				Nodata	1.72	POKER II	0.00
				POKER II	64.66		
				<i>D. horridus</i>			
				FP		FN	
				Mission	Proportion	Mission	Proportion
				JR 144 BIOPEARL I	8.00	POKER II	100.00
				PROTEKER	4.00		
				NIWA Database	4.00		
				POKER II	84.00		

Table S1.1 Proportion (%) of False positive (FP) and False negative (FN) for each species and recent missions. No data indicates there are not missions informations and Niwa database refers to data from NIWA databases but for which there are not missions informations too.

<i>S. neumayeri</i>			
FP		FN	
Mission	Proportion	Mission	Proportion
Antarktis XXIII	17.65	CEAMARC	50.00
ANT-XXIX-3	16.47	JR 230	50.00
CEAMARC	37.65		
JR 144 BIOPEARL I	7.06		
NIWA Database	4.71		
JR 230	7.06		
BENTART 06	3.53		
Nodata	7.06		

Table S1.1 (following) Proportion (%) of False positive (FP) and False negative (FN) for each species and recent missions. No data indicates there are not missions informations and Niwa database refers to data from NIWA databases but for which there are not missions informations too.

<i>C.nutrix</i>			<i>R.triplopora</i>		
Variables	Before CAML	After CAML	Variables	Before CAML	After CAML
Seafloor salinity	0.425 (1)	0.278 (2)	Geomorphology	0.584 (1)	0.413 (2)
Sea Ice	0.297 (2)	0.285 (1)	Sea Ice	0.514 (2)	0.596 (1)
Seafloor oxygen	0.272 (3)	0.144 (5)	SST range	0.404 (3)	0.338 (5)
SST range	0.195 (4)	0.107 (6)	Depth	0.385 (4)	0.352 (4)
Depth	0.17 (5)	0.165 (4)	Seafloor temperature	0.356 (5)	0.376 (3)
Chlorophyll a	0.117 (6)	0.029 (11)	SSS range	0.286 (6)	0.232 (7)
SSS range	0.108 (7)	0.09 (7)	Slope	0.283 (7)	0.225 (8)
SSS	0.103 (8)	0.171 (3)	Seafloor Temperature range	0.235 (8)	0.174 (9)
Geomorphology	0.072 (9)	0.086 (8)	SSS	0.201 (9)	0.331 (6)
Slope	0.061 (10)	0.042 (10)	Seafloor oxygen	0.079 (10)	0.042 (11)
Seafloor temperature	0.041 (11)	0.068 (9)	Chlorophyll a	0.071 (11)	0.065 (10)
Seafloor Temperature range	0.028 (12)	0.013 (12)	Seafloor salinity	0.033 (12)	0.03 (12)
Seafloor salinity range	0.012 (13)	0.007 (13)	Seafloor salinity range	0.028 (13)	0.017 (13)







	1 rank increase		1 rank decrease
	2 rank increase		2 rank decrease
	More than 2 rank increase		More than 2 rank decrease

Table S1.2. Respective contribution of environmental predictors to the different models run with and without CAML records for the five species. Ranked order of predictors follows the importance of contributions. Colors indicate the increase or decrease in the ranked order of each predictor between the two SDMs performed with and without CAML records.

<i>D. horridus</i>			<i>S. diadema</i>			<i>S. neumayeri</i>		
Variables	Before CAML	After CAML	Variables	Before CAML	After CAML	Variables	Before CAML	After CAML
Slope	0.43 (1)	0.317 (1)	Depth	0.547 (1)	0.625 (1)	Sea Ice	0.477 (1)	0.441 (1)
SSS	0.364 (2)	0.309 (2)	Seafloor salinity	0.318 (2)	0.126 (6)	Depth	0.267 (2)	0.215 (2)
Seafloor salinity	0.235 (3)	0.158 (4)	SST range	0.29 (3)	0.205 (4)	Seafloor temperature	0.178 (3)	0.203 (3)
Seafloor temperature	0.153 (4)	0.103 (6)	Sea Ice	0.26 (4)	0.35 (2)	Geomorphology	0.152 (4)	0.152 (5)
Geomorphology	0.13 (5)	0.213 (3)	Seafloor temperature	0.166 (5)	0.258 (3)	SST range	0.138 (5)	0.164 (4)
SST range	0.097 (6)	0.071 (7)	SSS	0.158 (6)	0.102 (7)	Seafloor oxygen	0.058 (6)	0.077 (7)
Chlorophyll a	0.094 (7)	0.035 (9)	Seafloor oxygen	0.145 (7)	0.155 (5)	SSS range	0.053 (7)	0.087 (6)
Seafloor oxygen	0.082 (8)	0.024 (10)	Geomorphology	0.095 (8)	0.081 (8)	SSS	0.04 (8)	0.073 (8)
Depth	0.065 (9)	0.058 (8)	Seafloor Temperature range	0.084 (9)	0.062 (9)	Seafloor salinity	0.022 (9)	0.023 (9)
Seafloor Temperature range	0.052 (10)	0.007 (11)	Slope	0.083 (10)	0.019 (13)	Seafloor Temperature range	0.013 (10)	0.008 (11)
SSS range	0.032 (11)	0.103 (5)	Chlorophyll a	0.039 (11)	0.043 (10)	Chlorophyll a	0.009 (11)	0.014 (10)
Seafloor salinity range	0.002 (12)	0.002 (12)	SSS range	0.036 (12)	0.033 (11)	Slope	0.009 (12)	0.007 (12)
			Seafloor salinity range	0.021 (13)	0.023 (12)	Seafloor salinity range	0.005 (13)	0.005 (13)







 1 rank increase	 1 rank decrease
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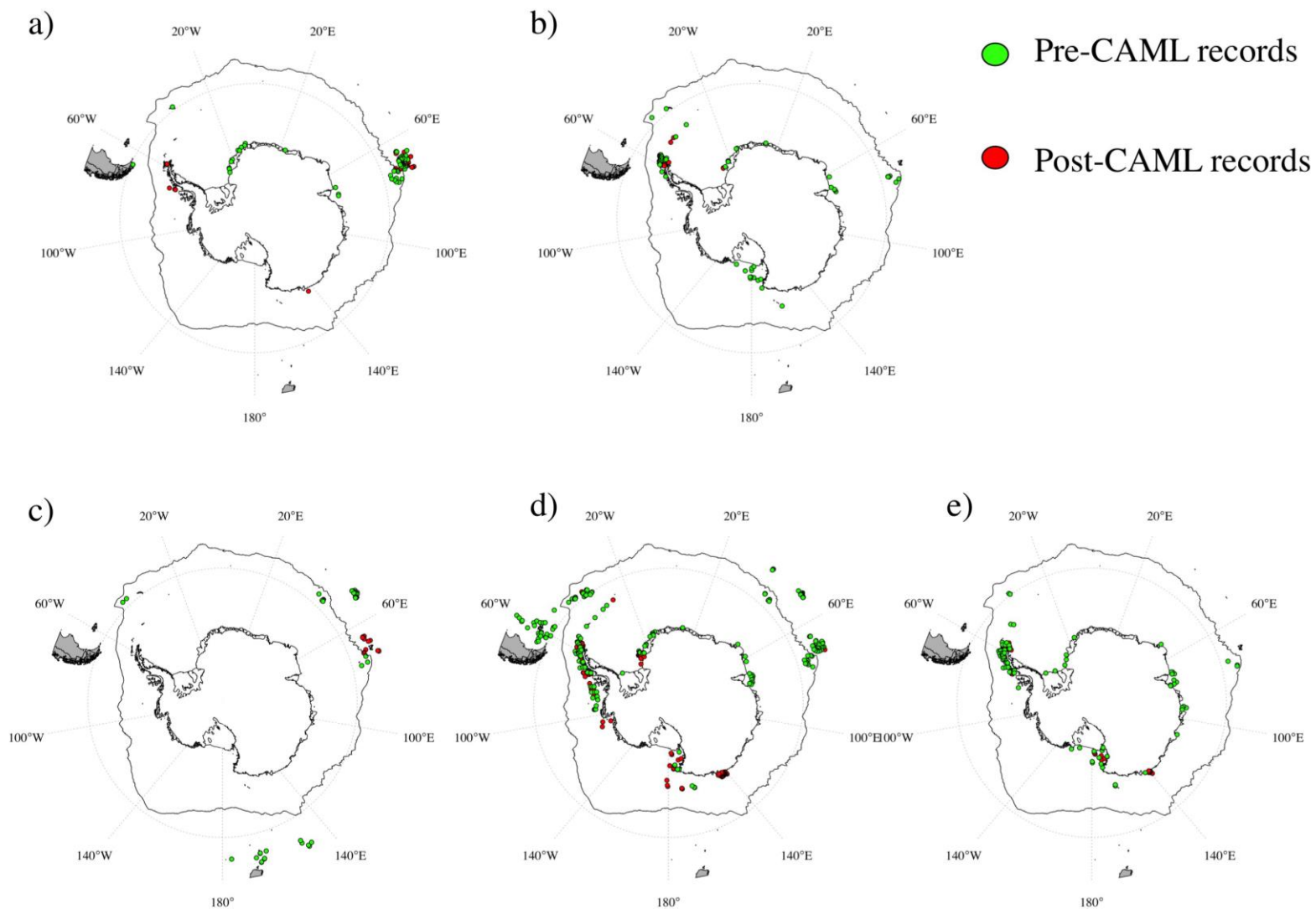


Figure S1.4. Distribution of pre – CAML (green dots) and post-CAML (red dots) records for: a) *Ctenocidaris nutrix*, b) *Rhynchocidaris triplopورا*, c) *Dermechinus horridus*, d) *Sterechinus diadema*, e) *Sterechinus neumayeri*